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In The Supreme Court of the United States

COMMONWEALTH OF MASSACHUSETTS, *et al.*,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

ON PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

AMICUS BRIEF IN SUPPORT OF PETITION FOR WRIT OF CERTIORARI

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Interests of Amici Curiae

The Alaska Inter-Tribal Council (AITC) is a statewide, tribally governed, non-profit organization that advocates on behalf of tribal governments throughout the state.

The Council of Athabascan Tribal Governments (CATG) is a consortium of the ten Tribes in the Yukon Flats region of Alaska, nine of which are federally recognized Tribes. CATG is comprised of nine Gwich'in Tribes and one Koyukon Athabascan Tribe that occupy lands in the Yukon Flats region in the northeastern interior of Alaska.

Resisting Environmental Destruction on Indigenous Lands (REDOIL), a project of the Indigenous Environmental Network, consists of Alaska Natives of the Inupiat, Yupik, Aleut, Tlingit, Gwich'in, Eyak and Denaiana Athabascan Tribes

AITC, CATG and REDOIL are greatly concerned about the impacts of global warming on their members. Living in the Arctic and sub-Arctic regions of Alaska, their members experience daily the effects of global warming, including thinning sea ice, increased coastal erosion, melting permafrost, and changes in plant and animal distributions.

Global warming is depleting the subsistence resources of the members of AITC, CATG and REDOIL and threatening their health and safety. As a result, the members of AITC, CATG and REDOIL have an interest in ensuring that the Federal Government has the authority under the Clean Air Act to regulate greenhouse gas emissions.

Authority for Filing Amicus Brief

Authority to file this brief is by consent under Supreme Court Rule 37. All parties to this case have consented to the filing of this brief.

Corporate Disclosure Statement

The *amici*, AITC, CATG and REDOIL, are all nonprofit corporations or organizations. None of them has a parent corporation, and no publicly held company has a 10 percent or greater ownership interest in any of these entities.

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Summary of Argument

By failing to heed the scientific consensus that global warming is occurring at an unprecedented rate, the Environmental Protection Agency (EPA) has ignored its mission to protect human health from environmental pollutants. No one feels the impacts of the Federal Government's inaction more than Alaska Natives, whose lives, traditions and cultures are in jeopardy.

Nowhere are the effects of greenhouse gas emissions more severe than in the Arctic, where the rate of warming is twice that of the rest of the world. Alaska is on the front lines of global warming: polar sea ice is disappearing, glaciers are receding, permafrost is melting, wildlife populations are declining, and coasts eroding. At stake is the physical and cultural survival of Alaska's oldest inhabitants.

The Environmental Protection Agency has clearly established authority to regulate greenhouse gases. Despite EPA's claim to the contrary, the plain meaning of the Clean Air Act, as well as its legislative history, mandate that the agency regulate air pollutants that may reasonably be anticipated to endanger public health or welfare. While regulating greenhouse gas emissions from automobiles would be only the first step toward addressing potentially catastrophic climate change, it is necessary if the unique traditions and communities of Alaska's Native peoples are to survive this century.

I. Introduction

> *"We are experiencing things in one lifetime that should take five or six generations. . . . We are making do with less [subsistence food] and trying to make the most of it."* — Ronald Brower Sr., speaking on behalf of the Inuit Circumpolar Conference (ICC).[1]

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[1] Margaret Bauman, *Conference Attendees Receive an Account of Arctic Warming*, Peninsula Clarion, at A2 (Nov. 30, 2005). The ICC is an international organization representing about 145,000 Inuit living in Arctic regions of Alaska, Canada, Greenland and Chukotka, Russia. *Id.*

Alaska Natives comprise eleven distinct cultures. These cultures are generally organized into five groupings that draw upon cultural similarities or geographic proximity: the Athabascan of the Interior and eastern Alaska, the Yup'ik and Cup'ik of western Alaska, the Inupiaq and St. Lawrence Island Yupik of the northern and northwestern Arctic, the Aleut and Alutiiq of Southcentral Alaska and Aleutian Islands, and the Eyak, Tlingit, Haida, and Tsimshian of the southeastern archipelago.[2]

Alaska Natives are politically organized into 228 federally recognized tribes.[3] The Federal Government has a "unique legal relationship" with tribal governments that includes recognizing Tribes as sovereign governments.[4] EPA and other federal agencies must "ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications."[5] EPA must give special consideration to Tribal interests in making Agency policy and insure the close involvement of Tribal Governments in making decisions and managing

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[2] *See* Alaska Native Heritage Center website at http://www.alaskanative.net/2.asp (last visited April 6, 2006).

[3] 70 Fed. Reg. 71194-01 (Nov. 25, 2005). The Federally Recognized Indian Tribe List Act, Pub. L. No. 103-454, 108 Stat. 4791 (1994), requires the Secretary of the Interior to keep a list of federally recognized tribes. 25 U.S.C. § 479a-1(a).

[4] *See, e.g.*, Exec. Order No. 13175 §3(a), 65 Fed. Reg. 67249 (Nov. 6, 2000) ("Agencies shall respect Indian tribal self-government and sovereignty, honor tribal treaty and other rights, and strive to meet the responsibilities that arise from the unique legal relationship between the Federal Government and Indian tribal governments."); *Executive Mem. on Government-to-Government Relations with Native American Tribal Governments* § 9 (April 29, 2004) (directing Federal agencies to operate "within a government-to-government relationship with federally recognized Native American tribes").

[5] *Id.* at § 5(a).

environmental programs affecting Tribal lands.[6]

The plain language of the Clean Air Act gives EPA authority to regulate greenhouse gas emissions from automobiles. Section 202(a)(1) and other provisions in the Clean Air Act require EPA to regulate air pollutants that endanger public health or welfare. 42 U.S.C. § 4521(a)(1) (EPA shall regulate air pollutants from motor vehicles that "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare"). The air pollutants subject to regulation under section 202 are defined as "any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air. . . ." Clean Air Act § 302(g), 42 U.S.C. § 7602(g).

"[W]elfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and *climate*, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants." Clean Air Act § 302(h), 42 U.S.C. § 7602(h) (emphasis added). Thus, a substance emitted into the air that endangers climate is subject to regulation under section 202.

In 2004, the Arctic Council commissioned a report that consolidated the scientific research on global warming trends, causes, and effects.[7] Nearly 300 scientists

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[6] Mem. of William Ruckelshaus, EPA Administrator, *EPA Policy for the Administration of Environmental Programs on Indian Reservations*, Nov. 8, 1984.

[7] The Council is a high-level intergovernmental forum that addresses the common concerns and challenges faced by the people and governments of the eight Arctic nations: Canada, Denmark/Greenland/Faroe Islands, Finland, Iceland, Norway, Russia, Sweden, and the United States; six Indigenous Peoples' organizations – Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit

collaborated on the report, the *Arctic Climate Impact Assessment*, which also included traditional knowledge from Arctic indigenous communities.[8] Among its key findings were that global temperature is rising at an unprecedented rate and the worst is still to come. There is a 90 percent probability that by 2100, the Earth will warm between 1.7 degrees and 4.9 degrees Celsius, resulting in more frequent heat waves, droughts, and extreme precipitation events.[9]

The annual average temperature in the Arctic has increased at almost twice the rate as that in the rest of the world over the past few decades.[10] Increasing global concentrations of carbon dioxide (CO_2) and other greenhouse gases are projected to contribute to additional Arctic warming of about 4 degrees to 7 degrees Celsius over the next 100 years.[11] Scientists predict the Arctic will enter a

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Circumpolar Conference, Russian Association of Indigenous Peoples of the North, and Saami Council; and scientific observers.

[8] Hassol, Susan Joy, Arctic Council, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment* 5 (2004) (hereinafter "ACIA report"). The six Arctic Indigenous Peoples' organizations submitted a statement to be included in the report. It was rejected as too political. The statement said, in part:

> *To Arctic Indigenous Peoples climate change is a cultural issue. We have survived in a harsh environment and if, as a result of global climate change, the species of animals upon which we depend are greatly reduced in number or location or even disappear, we as peoples would also disappear.*

Sheila Watt-Cloutier *et al.*, *Responding to Global Climate Change: The Perspective of the Inuit Circumpolar Conference on the Arctic Climate Impact Assessment, 2° Is Too Much! Evidence and Implications of Dangerous Climate Change in the Arctic* 59 World Wildlife Fund (2005).

[9] Thomas R. Karl & Kevin E. Trenberth, *Modern Global Climate Change*, 302 Science 1721 (2003).

[10] ACIA report, *supra* note 8, at 10.

[11] *Id.*

warming period not seen in recent history.[12]

In 2001, the Intergovernmental Panel on Climate Change (IPCC) released a definitive report on global warming. The *Third Assessment Report*, which incorporated the findings of hundreds of scientists from around the world, was reviewed and approved by more than 100 governments.[13] The report concluded that the increase in temperature in the 20th century was likely the largest of any century in the past 1,000 years.[14] Last year, 2005, was the warmest year in the last century.[15]

Moreover, the likely rate of future warming is much larger than the observed changes in the 20th century and is very likely to be without precedent during at least the last 100,000 years.[16] In part, this is because much of the anthropogenic carbon emissions is dissolved into the oceans.[17] Currently, the ocean and the land together are

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[12] Larry D. Hinzman *et al.*, *Evidence and Implications of Recent Climate Change in Northern Alaska and Other Arctic Regions*, 72 Climatic Change 252 (2005).

[13] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, Summary for Policymakers, at 2, J.T. Houghton, *et al.*, eds., Cambridge Univ. Press (2001). This IPCC report contains (i) up-to-date descriptions of the climate system and related factors, (ii) based on the knowledge of the international expert communities, (iii) produced by an open and peer-reviewed professional process, and (iv) based upon scientific publications whose findings are summarized in terms useful to decision makers. *Id.*, Technical Summary, at 2.

[14] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Summary for Policymakers, at 2.

[15] James Hansen, *et al.*, *Global Temperature Trends: 2005 Summation*, National Aeronautics and Space Agency (2005), *available at* http://data.giss.nasa.gov/gistemp/2005/.

[16] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Summary for Policymakers, at 13.

[17] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, at 197.

absorbing about half of the anthropogenic CO_2 emissions.[18] The total amount of carbon in the oceans is about 50 times greater than in the atmosphere.[19]

However, the capacity of the oceans to absorb anthropogenic CO_2 is decreasing as CO_2 levels increase.[20] The net effect will be more CO_2 in the atmosphere and an enhanced warming.[21] As a result, global mean temperature will increase for hundreds of years, even after CO_2 concentrations have been stabilized.[22] Further, many greenhouse gases reside in the atmosphere for centuries after being emitted, thereby causing a long-term warming effect.[23]

The IPCC report predicted a grim future for the Arctic:

> *The Arctic is extremely vulnerable to climate change, and major physical, ecological, and economic impacts are expected to appear rapidly.* A variety of feedback mechanisms will cause an amplified response, with consequent impacts on other systems and people. There will be different species compositions on land and sea, poleward shifts in species assemblages, and severe disruptions for communities of people who lead traditional lifestyles. In developed areas of the Arctic and where the permafrost is ice rich, special attention will be required to mitigate the detrimental impacts of thawing, such as severe damage to buildings and transport infrastructure.[24]

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[18] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Summary for Policymakers, at 7.

[19] *Id.* at 197.

[20] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, at 199.

[21] *See id.* at 224.

[22] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Technical Summary, at 76.

[23] *Id.* at 24.

[24] *Id.* at 60 (emphasis added). A process is called a feedback when the result of the process affects its origin thereby intensifying (positive feedback) or reducing (negative feedback) the original effect. *Id.* at 91.

International scientific consensus indicates that most of the atmospheric warming over the past 50 years is attributable to human activities, primarily the burning of fossil fuels.[25] Emissions from these activities increase concentrations of CO_2, methane, and other heat-trapping gases in the atmosphere.[26] Since the start of the industrial revolution, the atmospheric CO_2 concentration has increased by about 35 percent.[27]

As discussed below, the unchecked consumption of fossil fuels impairs the ability of Alaska's Native peoples to continue their way of life, which necessarily entails a close reliance on a stable Arctic environment.

II. Global Warming Threatens the Physical and Cultural Survival of Alaska Natives.

> *"Time is running out for the Arctic. We need far-reaching, long-term global commitments to reduce emissions of greenhouse gases if the Arctic is to be protected and if our human rights, particularly our human rights to subsistence, are to be respected."*
>
> — Sheila Watt-Cloutier, ICC Chair[28]

Alaska Natives have occupied Alaska for thousands of years.[29] They rely upon and have a sophisticated knowledge of their natural environment. This physical and spiritual relationship is sometimes encapsulated in the term "subsistence."

Congress defined subsistence as "the customary and traditional uses . . . of wild, renewable resources" for food, clothing, sharing, or other customary uses.[30] It also

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[25] ACIA report, *supra* note 8, at 2.

[26] ACIA report, *supra* note 8, at 2.

[27] *Id.*

[28] *Threat to North's Cultural Survival*, 109 ECO at 1 (Dec. 11, 2003).

[29] Norman A. Chance, *The Inupiat and Arctic Alaska: An Ethnography of Development*, 17-18, Harcourt (1990).

[30] Alaska National Interest Lands Conservation Act ("ANILCA"), 16 U.S.C. § 3113.

recognized the importance of Alaska Native subsistence by giving subsistence activities expanded protections under federal environmental and public land statutes.[31]

Alaska Natives, relying on their traditional knowledge of the sea, ice, land, and animals, thrive in an extreme environment.[32] These resources not only sustain the economic and nutritional viability of Alaska Native communities, they also provide a basis for social identity, spiritual life, and cultural survival.[33]

Global warming threatens drastic changes to the very existence of Alaska Native communities.[34] The sea ice is less stable, weather patterns are unusual, vegetation cover is changing, and key subsistence species are no longer found in traditional hunting areas during the expected seasons.[35]

Since the 1970s, Alaska Natives have reported environmental changes outside the bounds of "normal" variability.[36] They have reported sightings of American robins and salmon, whose normal range does not include the Arctic.[37] Several communities have observed changes in the health and behavior of caribou, a key subsistence species.[38]

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[31] *See, e.g.,* Endangered Species Act, 16 U.S.C. §1539(e) (exempting Alaska Natives from take provisions "if such taking is primarily for subsistence purposes"); Marine Mammal Protection Act, 16 U.S.C. § 1371(b) (exempting Alaska Natives from Act's take provisions if take "is for subsistence purposes"); Migratory Bird Treaty Act, 16 U.S.C. § 712(1) (enabling Secretary of Interior to permit Alaska Natives to take migratory birds and collect their eggs for seasonal subsistence use); ANILCA, 16 U.S.C. § 3114 (establishing subsistence preference for fish and wildlife uses on public lands).

[32] *See, e.g.*, ACIA report, *supra* note 8, at 94.

[33] *Id.* at 94.

[34] *Id.* at 94.

[35] *Id.*

[36] Sheila Watt-Cloutier *et al.*, *Responding to Global Climate Change, supra* note 8 at 59 (World Wildlife Fund 2005).

[37] Hinzman *et al.*, *supra* note 12, at 286.

[38] *Id.*

In the Pribilof Islands, villagers blame global warming and industrial contaminants for the decline of 20 species, ranging from kelp to sea lions.[39]

Climate change may be reducing salmon populations in Alaska.[40] Salmon and other fish make up 60 percent of Alaska Natives' subsistence resources.[41] Recent declines in fish populations directly affect the dietary and economic well-being of these people. In short, global warming is rearranging the environment upon which Alaska Natives depend to survive:

> The weather seems less stable and predictable. From sources of indigenous knowledge across the Arctic come reports that the weather seems more variable, unfamiliar, and is behaving unexpectedly and outside the norm. Experienced hunters and elders who could predict the weather using traditional techniques are now frequently unable to do so. Storms often occur without warning. Wind direction changes suddenly. In many places it is increasingly cloudy. Storms bringing high winds and lightning occur with increasing frequency in some locations. As noted by several elders, "the weather is harder to know." This presents problems for many activities, from hunting to drying fish, on which Indigenous Peoples depend.[42]

A. Global Warming Threatens Alaska Natives' Existence.

"The practice of coming out here and being on the land and hunting caribou is not only about feeding our families, because it is all we have to survive from. We don't have Safeways and Wal-Marts and stuff like that in

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[39] Margot Roosevelt, *Vanishing Alaska,* Time, Sept. 27, 2004, 68-70.

[40] Bruce P. Finney, *et al., Impacts of Climatic Change and Fishing on Pacific Salmon Abundance Over the Past 300 Years,* 290 Science 795, 797 (2000).

[41] ACIA report, *supra* note 8, at 119.

[42] ACIA report, *supra* note 8, at 96.

our tribes. But it's also about maintaining our culture and our spiritual relationship with these animals that we've had for time immemorial." — Evon Peter, Arctic Village, Alaska[43]

The continuation of the opportunity for rural residents in Alaska to engage in subsistence activities is essential to Native physical, economic, traditional and cultural existence.[44] The situation in Alaska is unique because, in most cases, no practical alternative means exists to replace food supplies and other items gathered from the fish and wildlife that supply rural residents dependent on subsistence activities.[45]

"[Fifty] percent of the food for three-quarters of the Native families in Alaska's small and medium villages is acquired through subsistence uses, and 40 percent of such families spend an average of six to seven months of the year in subsistence activities."[46]

1. Thinning and Receding Sea Ice Reduces Subsistence Resources on Arctic Coasts

"It looks like winter out there, but if you've really been around a long time like me, it's not winter. . . . If you travel that ice, it's not the ice that we traveled 40 years ago." — Orville Huntington, Alaska Native Science Commission.[47]

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[43] Evon Peter, *The People and the Caribou Are One, Voices from the Earth* (Spring 2005), *available at* http://www.sric.org/voices/2005/v6n1/caribou.html.

[44] ANILCA § 801(1), 16 U.S.C. § 3111.

[45] ANILCA § 801(2), 16 U.S.C. § 3111.

[46] *Native Village of Quinhagak v. Lujan*, 35 F.3d 388, 389-90 (9th Cir. 1994) (citing H.R. Rep. No. 1045, 95th Cong., 2d Sess., at 181 (1978)).

[47] Yereth Rosen, *Warming Climate Disrupts Alaska Natives' Lives*, Reuters, April 16, 2004, *available at* http://www.cnr.vt.edu/lsg/intro/global%20warmimg%20-%20alaska.pdf.

In the Arctic, sea ice is one of the most important factors influencing climate.[48] Changes in sea ice have enormous environmental, economic, and societal implications.[49] The Arctic is rapidly losing its permanent sea ice.[50] Within a century, the Arctic Ocean may have ice-free summers.[51]

The Arctic also exerts control over the global climate.[52] Much as a spillway in a dam controls the level of a reservoir, polar regions control the Earth's heat balance.[53] As the Arctic sea ice melts and shrinks, it reflects less sunlight and the dark, open ocean absorbs more heat, eventually warming the entire planet.[54]

As a result of the melting of sea ice, and a corresponding diminishing of snow cover on land, the far northern regions of North America, including Alaska, are exceeding global mean warming by about 40 percent.[55] This is due to a natural phenomenon known as poleward amplification: as the ice cover decreases, the oceans and land absorb more of the sun's energy, creating a positive feedback that in turn significantly increases warming in high latitudes.[56]

Scientists also warn that the melting of the polar ice sheets could have dire consequences.[57] If the current pace of melting continues, the seas will rise 10 or more meters,

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[48] *Id.*

[49] *Id.*

[50] J.T. Overpeck *et al.*, *Arctic System on Trajectory to New, Seasonally Ice-Free State*, 86 *EOS* 312 (2005).

[51] *Id.* at 309.

[52] Matthew Sturm *et al.*, *Meltdown in the North*, *Scientific American* 62 (Oct. 2003)

[53] *Id.*

[54] *Id.*

[55] IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Summary for Policymakers, at 13.

[56] *See* IPCC, *Third Assessment Report: The Scientific Basis*, Contribution of Working Group I, *supra* note 13, Technical Summary at 50.

[57] Jonathan M. Gregory *et al.*, *Threatened Loss of the Greenland Ice Sheet*, 428 Nature 616 (2004).

flooding areas inhabited by 25 percent of the U.S. population.[58] The Gulf and East Coast states will experience the brunt of the impacts.[59]

In the Arctic, this melting likely will have devastating consequences for polar bears, ice-dependent seals, walrus, and the Alaska Natives for whom these animals are a primary food source.[60] Sea ice supports an important food web of fish, seabirds, and marine mammals.[61] Phytoplankton blooms at the ice edge feed prolific arctic cod, which in turn feed beluga whales, narwhal whales, and harp seals.[62] Polar bears, walrus, and ringed seals use the ice for transportation and as a "floating platform for resting, feeding, and producing their young."[63]

The Inupiat and Yupik of Alaska's Arctic regions know and rely on this sea ice environment, traveling on the ice extensively in search of walrus, bowhead whales, and seals.[64] Caleb Pungowiyi of Nome recounted the importance of stable ice conditions:

> Ice is a supporter of life. It brings the sea animals from the North into our area and in the fall it also becomes an

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[58] U.S. Geological Service, *Sea Level and Climate*, *available at* http://pubs.usgs.gov/fs/fs2-00/.

[59] *Id.*

[60] ACIA report, *supra* note 8, at 8.

[61] U.S. Dept. of Interior, *Outer Continental Shelf Oil & Gas Leasing Program: 2002–2007 Final Environmental Impact Statement*, at 4-7 (April 2002).

[62] Nat'l Res. Council, Nat'l Academy of Sciences, *Cumulative Environmental Effects of Oil & Gas Activities on Alaska's North Slope*, at 92 (National Academies Press 2003).

[63] Margie A. Gibson & Sallie B. Schullinger, *Answers from the Ice Edge*, 8 (Arctic Network & Greenpeace U.S.A. 1998), *available at* http://archive.greenpeace.org/climate/arctic/reports/testimonies.pdf.

[64] Don Weller, *Effects of Climate Change on Subsistence Communities in Alaska, Assessing the Consequences of Climate Change for Alaska and the Bering Sea Region: Proceedings of a Workshop at the University of Alaska Fairbanks* 66 (Nov. 1999).

> extension of our land. When it freezes along the shore, we go out on the ice to fish, to hunt marine mammals and to travel. . . . When it starts disintegrating and disappearing faster it affects our lives dramatically.[65]

Many Arctic communities depend on hunting polar bear, walrus, seals, whales, seabirds and other marine animals.[66] The thinning and retreating sea ice also makes it dangerous to hunt walruses, seals and whales.[67] In 1998, whalers from the village of Wainwright had to be rescued after the ice floe they were on broke up and drifted out to sea.[68]

The thinning and receding of sea ice also is decimating subsistence resources:

> Gathering food directly from the land and the sea makes the Yupik very careful observers of their surroundings. In recent years, they have noticed that the walrus are thinner, their blubber less nutritious and oil from walrus fat does not burn as bright in their lamps as in times of old. At the same time, they have noticed that there are fewer and weaker seals. The Yupik hunters have had to go farther and farther from shore to reach the ice pack to find the newborn seals that are being fed fish from nearby waters by their parents.[69]

As large-scale warming has reduced the extent of ice upon which seals and walrus rest between searches for food, these key marine mammals become weakened and less productive, providing less sustenance for Native

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[65] ACIA report, *supra* note 8, at 24.

[66] *Id.* at 61.

[67] Jim Motavalli, *Feeling the Heat: Dispatches from the Frontlines of Climate Change* 108, Routledge (2004).

[68] *Id.*

[69] Nat'l Assessment Synthesis Team, U.S. Global Change Res. Program, *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change* 366, (2000) (citing D.A. Rothrock *et al.*, *Thinning of the Arctic Sea-Ice Cover*, 26 *Geophysical Research Letters* 3469 (1999)).

communities.[70] Ice dependent seals, including the ringed seal, ribbon seal, and bearded seal, are particularly vulnerable because they give birth and nurse their pups on the ice.[71] They also forage near the ice edge, an extremely productive area especially sensitive to climate change.[72] As the ice melts, seal and walrus populations will decline.[73]

2. Melting Permafrost Diminishes Subsistence Resources

Permafrost is subsurface material that remains continuously frozen for at least two consecutive years.[74] The permafrost regions occupy approximately 24 percent of the Northern Hemisphere's terrestrial surface.[75] As the climate differentially warms in summer and winter, the active layer (the soil layer above permafrost that annually freezes and thaws) will thicken.[76]

Thickening of the active layer has two immediate effects.[77] First, decomposed plant material frozen in the upper permafrost thaws, exposing the carbon to microbial decomposition, which can release CO_2 and methane (CH_4) to the atmosphere.[78] These Greenhouse gas releaseses may be considerable.[79]

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[70] Nancy G. Maynard, *Final Report: Native Peoples-Native Homelands Climate Change Workshop* 62 (1998) (citations omitted).

[71] ACIA report, *supra* note 8, at 59.

[72] *Id.*

[73] *Id.*

[74] U.S. Arctic Research Comm'n, *Climate Change, Permafrost, and Impacts on Civil Infrastructure*, 3 (2003), *available at* http://www.arctic.gov/publications.htm

[75] *Id.* at 5.

[76] U.S. Arctic Research Comm'n, *The Arctic Ocean and Climate Change: A Scenario For The U.S. Navy*, 10 (2002) *available at* http://www.arctic.gov/publications.htm

[77] U.S. Arctic Research Comm'n, *Climate Change, Permafrost, and Impacts on Civil Infrastructure, supra* note 74, at 7.

[78] *Id.* at 8. Because considerable quantities of carbon are sequestered in the upper layers of permafrost, a widespread increase in the thickness of

Second, the ice in the upper permafrost is converted to water.[80] When ice-rich permafrost thaws, the surface subsides.[81] Typically, this settling does not occur uniformly over space, but produces a chaotic surface with small hills and wet depressions known as thermokarst terrain.[82] When thermokarst occurs beneath a road, house, pipeline, or airfield, it can compromise their structural integrity and lead to collapse.[83] With regional warming, large areas may subside and areas near the coast may be inundated by encroaching seas.[84]

Global warming will likely trigger a new episode of widespread thermokarst, with serious consequences for most of the engineered works constructed in the Arctic during the twentieth century.[85] Already, melting permafrost has created underground voids that collapse into sinkholes in northern areas, such as the city of Fairbanks, has toppled spruce trees, and has rippled pavement and bike trails.[86] Homes and buildings will sag into ruin.[87]

Elsewhere, entire forests appear to be sinking or

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the thawed layer could lead to the release of large quantities of CO_2 and CH_4 to the atmosphere. *Id.* (citations omitted). This in turn would create a positive feedback mechanism that could amplify regional and global warming. *Id.*

[79] David M. Lawrence and Andrew G. Slater, *A Projection of Severe Near-Surface Permafrost Degradation During the 21st Century*, 32 Geophysical Research Letters L24401 (Dec. 17, 2005).

[80] *Id.*

[81] *Id.*

[82] *Id.*

[83] *Id.*

[84] *Id.*

[85] *Id.* at 13-14.

[86] Doug O'Hara, *Permafrost is Warming*, Anchorage Daily News, at A1 (Aug. 14, 2005).

[87] *Id.*

drowning as melting permafrost forces water upward.[88] Alaskans call the phenomenon "drunken trees."[89]

3. Warming Threatens Caribou, a Key Food Source

> *"Sometimes when they're supposed to show up, they don't show up. Sometimes they show up when they're not supposed to show up. . . . We've got 15 villages in Northeast Alaska and North Yukon Territory, and some in Northwest Territory, where the same people are depending on one caribou herd. We're caribou people . . . and we all depend on that same herd that migrates through our villages."* — Sarah James, Arctic Village, Alaska[90]

Native peoples in more than 25 villages — more than 5,000 households — in northwestern Alaska depend on the caribou for subsistence.[91] Caribou are prominent in Alaska Native mythology, spirituality and cultural identity.[92]

Anthropogenic warming is projected to reduce the traditional forage for caribou herds, which in turn could lead to reduction in herd size.[93] Caribou depend on the availability of abundant tundra vegetation and good foraging conditions, especially during the calving season.[94] Vegetation changes caused by climate change, along with rising sea levels, are projected to shrink the tundra area to its lowest extent in the past 21,000 years, greatly reducing

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[88] Timothy Egan, *Alaska, No Longer So Frigid, Starts to Crack, Burn and Sag*, N.Y. Times, §1 at 1 (June 16, 2002).

[89] *Id.*

[90] ACIA report, *supra* note 8, at 73.

[91] U.S. Geological Service, *Status and Trends of the Nation's Biological Resources, Part 2* (Alaska), *available at* http://biology.usgs.gov/s+t/SNT/noframe/ak177.htm (hereinafter "USGS report").

[92] ACIA report, *supra* note 8, at 71.

[93] *Id.*

[94] *Id.* at 70.

breeding areas for many birds and grazing areas for land animals.[95]

Freeze-thaw cycles and freezing rain are also projected to increase.[96] Ice crust formation from freeze-thaw events affects most Arctic land animals by encapsulating their food plants in ice, severely limiting forage availability and sometimes killing the plants.[97] This freeze-thaw effect has caused caribou populations to crash dramatically and more frequently.[98] As the caribou herds face increasing trouble, communities that rely on them for subsistence are forced to reduce their harvest to ensure the sustainability of the herds.

B. Global Warming Is Endangering the Health and Safety of Alaska Natives

> *"The storms are getting more frequent, the winds are getting stronger, the water is getting higher and it's noticeable to everyone in town. If we get 12 to 14 foot waves, this place is going to get wiped out in a matter of hours. We're in panic mode because of how much ground we're losing. If our airport gets flooded out, there goes our evacuation by plane."* — Robert Iyatunguk, erosion coordinator for Shishmaref[99]

The effects of global warming have created health, safety, and security problems for Alaska Native communities. For example, the thinning and receding sea ice make subsistence hunts more dangerous. People are forced to travel farther across rough, open seas to reach the ice where the animals are found. These trips are more dangerous and costly.[100] When they reach the ice, it is unreliable and pieces often break off and float away in the

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[95] *Id.* at 46.

[96] *Id.* at 70.

[97] *Id.* at 68.

[98] *Id.* at 69.

[99] *Id.* at 80.

[100] Joseph B. Verrengia, *In Alaska, an Ancestral Island Home Falls Victim to Global Warming*, Associated Press (Sept. 10, 2002).

midst of a hunt. In 2002, more than 100 stranded hunters had to be rescued when the ice on which they were hunting drifted far from shore.[101]

Melting permafrost also threatens the security of Arctic communities. Permafrost stabilizes the ground, buttressing shorelines against fierce Arctic storms.[102] As the permafrost warms and thaws, that buffer dissolves and shorelines erode.[103] This effect is compounded by the retreat of the sea ice, which no longer provides a calming influence on the often rough seas.[104]

In Shishmaref, for example, retreating sea ice and thawing permafrost have exposed the village to erosion from Arctic storms, which are fiercer and more frequent than in the past.[105] In this village, which sits on a narrow barrier island on the Chukchi Sea, several homes have fallen over a bluff and others teeter on its edge. The 600 village residents have watched one end of their village being eaten away, losing as much as 15 meters of land overnight in one storm.[106] In the past 30 years, 100 to 300 feet of coastline has washed away, half of it since 1997.[107]

The absence of sea ice also deprives the residents of their route of travel to the mainland to hunt moose and caribou as they normally would do by early November.[108] Now, that waterway is ice free in autumn.[109]

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[101] *Id.*

[102] Orson P. Smith, & George Levasseur, *Impacts of Climate Change on Transportation Infrastructure in Alaska, The Potential Impacts of Climate Change on Transportation, Part II, Regional Case Studies* 6 (U.S. Dep't of Transportation 2001).

[103] *Id.* at 5-6.

[104] *Id.* at 7; ACIA report, *supra* note 8, at 80.

[105] ACIA report, *supra* note 8, at 80.

[106] *Id.*

[107] Roosevelt, *supra* note 38.

[108] ACIA report, *supra* note 8, at 80.

[109] *Id.*

Shishmaref is not an anomaly. At Point Hope, a bowhead-whaling village that dates from 600 B.C., flooding seawater threatens the airport runway and a seven-mile evacuation road. [110] "During storms, some people begin to panic," town official Rex Rock told *Time*.[111]

An investigation by the General Accounting Office, an investigative arm of Congress, found that 184 out of 213 (86.4 percent) Alaska Native villages experience some level of flooding and erosion.[112] The GAO report stated that:

> Native villages on the coast or along rivers are subject to both annual and episodic flooding and erosion. Various studies and reports indicate that coastal villages in Alaska are becoming more susceptible to flooding and erosion in part because rising temperatures cause protective shore ice to form later in the year, leaving the villages vulnerable to fall storms. . . . In addition, villages in low-lying areas along riverbanks or in river deltas are susceptible to flooding and erosion caused by ice jams, snow and glacial melts, rising sea levels, and heavy rainfall.[113]

The cost of relocating these villages will be high.[114] For example, Shishmaref residents voted to leave the community their families have inhabited for the past 4,000 years and move to a site twelve miles away.[115] Unfortunately, they lack the many millions of dollars such a move would cost.[116] For now, Shishmaref and three other Alaska Native villages the Federal Government has found to be in "imminent

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[110] Roosevelt, *supra* note 38.

[111] *Id.*

[112] U.S. General Accounting Office, *Alaska Native Villages: Most Are Affected by Flooding and Erosion, But Few Qualify for Federal Assistance*, 2-3 (December 2003) (hereinafter "GAO report").

[113] *Id.* at 3.

[114] *Id.*

[115] ACIA report, *supra* note 8, at 80; Roosevelt, *supra* note 38.

[116] Verrengia, *supra* note 100, at 5.

danger" will remain where they are, exposed to the consequences of global warming.[117]

III. Conclusion

As a result of global warming, the changes occurring in Alaska are among the most dramatic on Earth, even though the vast majority of the world's greenhouse gas emissions originate elsewhere. This dramatic destruction of the Arctic is an early warning for the rest of the world of the devastation that will likely occur if industrialized nations and the industries that drive them fail to significantly curb their emissions of greenhouse gases. The longer the Federal Government delays regulation of greenhouse gases, the more severe and long lasting the effects of global warming are certain to be.

Reducing greenhouse gas emissions from automobiles is a critical first step toward ensuring the survival of Alaska's Native communities. Thus, *amici* urge this Court to grant the Petition for Certiorari.

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[117] Roosevelt, *supra* note 38; GAO report, *supra* note 112, at 4.